

A Prospective Study of Incident Comprehensive Medical Home Care Use among the Elderly

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Abstract: This prospective study directly examines, in a defined community population, the extent to which a wide array of characteristics predict utilization of an important long-term care (LTC) service—medical home care—over a two-year interval among the cohort of 3,706 people aged 65 or older. The overall age-sex adjusted rate of two-year incident home care use was 3.2 per cent. For both men and women, the rates among the aged 85 or older group were approximately 12 times the rates of those aged 65 to 74. The multivariate predictors of incident home care, adjusted for age and sex, were five: receiving help with at least one activity of daily living

(ADL), being dependent in Rosow-Breslau functional health areas, being homebound, more errors in mental status items, and no involvement with social groups. The dominance of indicators of frailty in physical function and cognitive function are consistent with the predictors of another group of LTC clients, those who subsequently enter nursing homes. However, in the present study the ratios of medical home care use were similar for those living alone and for those living with others in the multivariate model, suggesting the possibility of differences between home care and institutional LTC clients. (*Am J Public Health* 1988; 78:255–259.)

Introduction

Home health care is an important component of comprehensive long-term care (LTC) services. At least as reflected by public funding, US health policy has emphasized institution-based LTC services such as those provided by nursing homes. In response to concerns of overreliance on nursing home services, quality and appropriateness of care, and cost containment, attention turned to alternatives such as community-based services in the mid and late 1970s.^{1,2} Not only were home delivered services thought to be preferred by older people,³ but it was argued that such options could reduce overall long-term care expenditures.^{4–6} Several demonstration projects were initiated with the intent of testing whether the availability of a full array of long-term care services in fact would reduce aggregate expenditures.^{7,8} While the findings from these studies differ in specifics, in general they suggest that expansion of community care has limited influence on institutional costs and thus increase total expenditures.^{9–12}

Cost savings are dependent to a large degree upon individuals receiving home care as a substitute for nursing home care, but these studies raise the question of whether home care programs and nursing homes were drawing clients from the same population. Appelbaum¹³ and colleagues note that only 7.2 per cent of participants in the National Channeling Demonstration Projects were either applicants or on waiting lists for nursing home placements. Increased knowledge of the risk factors associated with home care utilization is an important step in resolving this question.

There currently are no prospective community-based studies of the characteristics predictive of enrollment in medical home care programs among older persons in the US. The present prospective study examines the relationships between a number of baseline characteristics and subsequent entry into a comprehensive medical home care program over

a two-year interval among residents aged 65 years or older in a geographically defined community.

Methods

Subjects

Between January 1982 and December 1983, we identified and attempted to interview all persons aged 65 and older in East Boston, a geographically defined community that is part of the National Institute on Aging's four-site project to develop Established Populations for Epidemiologic Studies of the Elderly (EPESE).¹⁴ Enumeration of all household residents was completed with 99.8 per cent of East Boston households. The population aged 65 years and older numbered 4,485, of whom 3,663 (82 per cent) completed the interview in person and 149 (3 per cent) completed the interview at least partly by proxy (n=3,812). The remaining non-participants (15 per cent) were not different in gender but were slightly older and more likely to be living with others than the participants.* The baseline home interview and examination, which averaged approximately 70 minutes, included information on demographic characteristics, height, weight, blood pressure, pulmonary function (peak expiratory flow rate), health status, medical history, symptoms, medications, smoking and alcohol use, functional status and activities of daily living, cognitive function, depression, social networks, and utilization of health and social services. The lay interviewers received extensive training in the uniform administration of the structured questionnaire and the taking of measurements.

Comprehensive Medical Home Care

Persons categorized as incident home care clients were those who entered in the East Boston Neighborhood Health Center (EBNHC) Medical Home Care Program up to 24 months after the baseline interview (n=112). The EBNHC is a community-directed, comprehensive health center that is the major provider of primary medical care to the residents of East Boston. The EBNHC has had a Medicare- and Medicaid-certified Medical Home Care Program for elderly and chronically disabled homebound persons living in East

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Editor's Note: See also related editorial p 238 this issue.

*Adams ME, Scherr PA, Branch LG, *et al*: Comparison of demographic and health characteristics of participants and non-participants in a community survey of the elderly. Manuscript submitted for review, 1987.

Boston since 1972. This program uses a medical model of managed home care in which a multidisciplinary team of physicians, nurse practitioners, nurses, social workers, physical therapists, and homemaker/home health aids works closely together to provide coordinated medical and social services for homebound elderly for an indefinite duration.

Using the EBNHC Home Care registration files, which include dates of admission and discharge from home care, it was possible to identify all study participants who subsequently received home care within 24 months of their initial interview ($n=112$). The prevalent home care participants ($n=105$) were excluded from the analyses.

Study Variables

The events of interest in this analysis are whether the elderly cohort members began to receive medical home care within 24 months of their own baseline interviews. Of the 3,707 study participants not enrolled in the Home Care Program at the beginning of the study, 112 enrolled for an unadjusted rate of incident home care during this 24-month interval of 3.0 per cent. Although the EBNHC Medical Home Care Program is a large home care provider in this area, this rate does not represent total more broadly defined home care use in the study community. Two other types of home care are not included—home health provided by the Boston Visiting Nurse Association (BVNA), and social home care provided by the Massachusetts network of Home Care Corporations. The BVNA program services about 40 per cent of its clients under a Medicare model of short-term rehabilitative home care following hospitalization, and the remaining clients do not receive managed care through a nurse practitioner as is the case with the EBNHC program. The Home Care Corporations emphasize longer term assistance with maintaining a household in the community by providing homemaker, chore, and home-delivered meal services, and do not provide the services of physicians, nurses, or other medical providers. They sometimes share clients with the EBNHC Home Care Program.

We examined the association of 21 independent variables, each derived from the 1982–83 baseline interview, with subsequent Home Care Program participation. These variables were chosen because they comprise the range of variables suggested by previous research as associated with use of LTC services, and include six demographic characteristics, six informal support network characteristics, four functional status indicators, two mental status indices, and three health care status variables.

Among the demographic variables, *marital status* was examined as three dichotomies: currently married or not; currently widowed or not; and currently widowed, divorced, or separated versus not. Similarly, *living arrangement* was examined as two dichotomies: living alone or not; and living with one other person age 75 or older or not. Among the informal support network characteristics, *children's proximity* was derived from the respondents' estimate of whether or not any of their children lived within a 30-minute commute.

Among the functional status indicators, *ADL status* designates elders who use assistance in performing one or more of six basic activities of daily living: bathing, dressing, transferring, eating, walking across a small room, and grooming.^{15,16} The *Rosow-Breslau Functional Health Scale* identifies those who report they are unable to perform at least one of three activities: walking a half mile, climbing stairs, and doing heavy housework.¹⁷ Instrumental activities of daily living (*IADL status*), differentiates those who need help with

at least one of the following areas necessary to maintain a household in the community: grocery shopping, food preparation, transportation, and housekeeping. *IADL status* was dichotomized and examined in two ways: those whose help with *IADL* comes from formal or paid sources versus all others, and those who receive either formal or informal help versus those who use no help at all.

Among the mental status indicators, *mental status questionnaire score* differentiates those who make five or more errors on nine items from a mental status questionnaire variant.¹⁸ The *depression* variable differentiates those who answer five or more of 10 items from a modification of the Center for Epidemiological Studies-Depression Scale (CES-D)¹⁹ in the depressed direction from those who answered four or less in the depressed direction. The modification retained 10 of the original 20 CES-D items and offered two rather than four response categories. Imputed scores were derived for 193 people who answered all but one of the mental status or depression items. The missing item was given a value equal to the mean of the individual's other items, rounded to the nearest whole number.

The variables selected as measures of health care status were self-reported hospitalizations in the year prior to interview, having a usual source of medical care, and self-assessed health.

Survival analysis methods were used to analyze these data.²⁰ The dependent variable was time to home care from the baseline survey (from one to 24 months). Those who died or entered nursing homes during this period were considered censored as of the time of this event. Those who remained in the community were censored at 25 months. Age- and gender-specific incidence rates were obtained from Kaplan-Meier curves evaluated at two years for each subgroup. Overall age-sex-adjusted rates were obtained by weighting the subgroup-specific rates to the age-sex distribution of the total population. Incidence rate ratios (relative risk estimates) and confidence intervals (CIs) were obtained from Cox proportional hazards models stratifying by age and gender. All estimates therefore are adjusted for age and gender. Variables considered important whose 95 per cent CI did not overlap unity when examined individually were simultaneously entered into a Cox model. These analyses were run using PROC PHGLM of the Statistical Analysis System.²¹

Results

Bivariate Predictors of Medical Home Care Use

Table 1 presents the age- and sex-specific rates of entering medical home care for the total population and for each level of the independent variables. In addition, the overall age-sex adjusted rates for each level of the independent variables, the incidence rate ratio for the predictor variable, and the confidence intervals of the predictor variable (adjusting for age and sex) are presented. Rates of incident home care utilization within the over 65 population were strongly related to age. For both men and women, those aged 85 or older had rates of entry approximately 12 times those of the 65–74 age group.

In analyses adjusted for age and sex only, those entering medical home care were generally similar to the others with respect to the demographic measures.

With regard to informal support network characteristics, individuals with no group memberships were 2.3 times as likely to enter home care; those with no children within a

TABLE 1—Rates of Two-Year Incident Medical Home Care Use for Selected Characteristics by Age and Sex among Community-Dwelling East Boston Senior Health Project Participants

Selected Characteristics	(N)	Males by Age			Females by Age			Age-Sex-Adjusted Rate	Incident Rate Ratio ^a	95% Confidence Intervals
		65–74	75–84	85+	65–74	75–84	85+			
Total Population Demographics	(3706)	1.1	5.1	12.6	1.5	4.3	17.6	3.2	—	—
Education										
Elementary or less	(1898)	1.0	5.4	13.0	1.7	4.3	17.4	3.5	1.19	0.78–1.84
More than elementary	(1753)	1.1	5.0	14.3	1.3	3.0	12.5	2.9		
Marital status-A										
Currently married	(1759)	1.3	5.7	16.2	1.2	4.3	29.3	4.0	1.17	0.76–1.80
Not currently married	(1947)	0.4	4.1	9.8	1.7	4.2	16.6	3.0		
Marital status-B										
Widowed	(1409)	0.0	6.2	9.8	1.5	3.9	18.1	3.1	0.96	0.63–1.47
Not widowed	(2297)	1.2	4.8	14.8	1.4	4.9	14.9	3.4		
Marital status-C										
Widowed, Divorced, Separated	(1600)	0.7	5.3	8.9	1.5	4.0	17.5	3.1	0.89	0.58–1.35
Not	(2106)	1.2	5.1	16.0	1.5	4.8	18.1	3.6		
Living arrangement-A										
Alone	(1409)	0.6	2.2	8.8	1.6	4.6	15.9	2.9	0.88	0.59–1.30
Not alone	(2297)	1.2	6.1	14.5	1.4	3.7	19.7	3.5		
Living arrangement-B										
Living with one age 75 or older	(444)	0.0	6.2	14.2	2.7	3.4	50.0	5.1	1.30	0.79–2.15
Not	(3257)	1.1	4.8	11.6	1.3	4.4	16.0	3.2		
Medicare										
Covered	(3363)	1.2	5.6	12.9	1.5	4.1	19.9	3.5	3.01	0.95–9.47
Not	(292)	0.0	0.0	16.7	0.8	2.7	0.0	1.3		
Medicaid										
Covered	(893)	0.6	2.8	15.7	3.2	6.7	14.2	4.0	1.41	0.94–2.10
Not	(2746)	1.2	5.6	12.3	0.9	2.6	20.5	3.0		
Income										
Less than \$7,000 per year	(1816)	1.5	3.7	8.5	1.8	4.3	18.0	3.3	1.07	0.66–1.74
\$7,000 or more	(1357)	0.9	5.3	30.8	0.8	2.6	0.0	2.5		
Informal Support Network										
Living children										
None	(733)	0.6	2.9	5.3	2.3	4.0	4.8	2.4	0.77	0.46–1.30
One or more	(2924)	1.2	5.8	14.9	1.3	4.2	19.7	3.5		
Children's proximity										
More than 1/2 hour	(1090)	0.4	2.0	4.2	1.5	2.8	10.9	2.0	0.55	0.34–0.91
Within 1/2 hour	(2554)	1.4	6.6	15.2	1.5	4.5	18.5	3.7		
Close friends										
None	(874)	1.0	6.9	16.2	2.6	3.0	21.0	4.0	1.33	0.89–1.98
One or more	(2774)	1.1	4.2	11.8	1.2	4.4	15.5	3.1		
Contact with close friends										
Fewer than 3 seen monthly	(2109)	1.4	7.1	14.1	1.7	3.6	20.0	3.7	1.42	0.94–2.16
3+ seen monthly	(1532)	0.9	2.3	12.6	1.2	4.6	9.2	2.6		
Death in last year of close friend or relative										
Yes	(1767)	1.5	3.0	15.1	1.7	3.9	17.2	3.3	1.01	0.69–1.48
No	(1879)	0.7	7.3	11.2	1.3	4.1	15.6	3.2		
Social group involvement										
Not involved	(2355)	1.4	6.5	15.6	1.6	5.0	21.5	4.0	2.27	1.38–3.74
Involved	(1307)	0.7	2.7	8.9	1.3	2.1	0.0	1.6		
Functional Status										
Homebound										
Yes	(205)	14.4	15.4	37.5	12.4	11.2	31.2	14.6	4.53	2.88–7.12
No	(3234)	1.0	4.4	8.8	0.7	4.3	14.4	2.8		
ADL status										
Receive help with at least one of the 6 areas	(647)	7.8	15.0	24.4	5.9	11.4	28.3	9.9	6.22	4.15–9.32
No help received	(3032)	0.4	2.9	7.9	0.9	1.7	8.8	1.7		
Rosow-Breslau Functional Health Scale										
Unable to do at least one of 3 areas	(1731)	3.0	8.5	15.7	2.4	6.5	19.1	5.1	5.50	3.01–10.03
Able to do all	(1896)	0.3	1.9	4.8	0.6	0.0	18.2	1.5		
IADL status-A										
Help from formal source	(320)	0.0	6.6	27.0	1.1	11.9	35.4	5.7	3.04	1.96–4.70
Self-sufficient or informal help	(3259)	1.1	5.2	7.5	1.4	2.0	12.8	2.6		
IADL status-B										
Formal or informal help	(1052)	0.7	6.1	15.8	4.4	7.3	20.1	5.2	3.16	2.02–4.95
Self or spouse	(2563)	1.2	4.9	7.4	0.8	1.0	5.0	1.7		
Mental Status										
Mental Status Questionnaire ^b										
5 or more of 9 in error	(156)	5.9	16.1	39.0	9.1	7.5	28.8	10.5	3.06	1.79–5.23
4 or less of 9 in error	(3350)	0.9	3.6	9.0	1.3	3.5	13.8	2.7		
Depression ^b										
5 or more of 10 CES-D items	(725)	4.4	6.2	21.3	2.1	5.6	28.4	5.6	2.09	1.36–3.20
4 or less	(2768)	0.5	4.1	10.9	1.1	3.4	14.6	2.6		

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TABLE 1—Continued

Selected Characteristics	(N)	Males by Age			Females by Age			Age-Sex-Adjusted Rate	Incident Rate Ratio ^a	95% Confidence Intervals
		65–74	75–84	85+	65–74	75–84	85+			
Health Care Status										
Hospitalization history										
Hospitalized in year before baseline	(726)	2.4	8.7	7.2	3.3	3.8	8.5	4.0	1.20	0.78–1.84
Not	(2939)	0.8	3.4	15.0	1.2	4.4	22.5	3.3		
Usual source of medical care										
Has one	(3277)	1.3	5.2	15.0	1.4	4.3	16.9	3.4	1.24	0.65–2.38
Does not	(423)	0.0	4.7	0.0	1.8	3.9	27.3	3.2		
Self-perceived health										
Poor	(298)	6.1	15.9	16.7	4.2	7.2	22.0	7.6	2.71	1.68–4.34
Excellent, good, fair	(3371)	0.8	4.0	11.8	1.1	3.6	16.5	2.8		

a) Relative risk of home care use for those possessing the variable of interest compared to those not possessing that variable, adjusted for age and sex; rate ratio is calculated with the Cox model rather than with the ratio of age-adjusted rates.

b) With imputed values for one missing item for 193 respondents.

30-minute trip were only half as likely (.55) to enter home care.

In contrast to the patterns observed with demographic variables, all measures of impaired functional status tested were strong predictors of subsequent home care utilization in the analyses adjusted only for age and sex.

Individuals with five or more mental status questionnaire errors were three times as likely to use home care as those with fewer errors; individuals reporting five or more depressive symptoms were two times as likely to enter home care as were those reporting fewer depressive symptoms.

Those who had a hospitalization history prior to the baseline interview or a usual source of medical care did not differ with respect to risk of home care entry from those who did not. However, individuals assessing their health as poor were nearly three times as likely to use home care as those assessing their health as excellent, good, or fair.

Multivariate Predictors of Medical Home Care Use

We assessed the ability of nine predictors, adjusted by age and sex, to predict subsequent home care utilization independently as candidate variables for a Cox proportional hazard regression model with time to incident home care use as the dependent variable. Table 2 presents the results; five variables are predictive of incident medical home care use, after controlling for the simultaneous influence of all the other factors: receiving help with at least one ADL, being dependent in Rosow-Breslau functional health areas, being homebound, more errors in mental status items, and no involvement with social groups.

Discussion

This two-year prospective study investigates directly an important LTC service, namely medical home care, and has the advantage of collecting data on predictors of home care before the individual enters home care. Further, the comparison group is an unselected population, namely almost everyone (85 per cent) aged 65 and older living in the community.

The multivariate analysis presented here suggests that persons at elevated risk for subsequent medical home care are those who have substantial limitations in physical function, cognitive function, and social function. Interestingly, none of the demographic characteristics—education, marital status, living arrangement, or income—were associated with

TABLE 2—Relative Risk of Two-Year Medical Home Care Incidence among Community-Dwelling East Boston Senior Health Project Participants Adjusted by Age and Sex as Estimated by Cox Proportional Hazards Model (N=3,288)

Candidate Variables	Relative Risk	95% Confidence Interval
Informal Support Network		
No social group involvement/Yes	1.85	1.04–3.30
No child within 30 minutes/Some	0.71	0.41–1.24
Functional Status		
Homebound/Not	2.06	1.19–3.57
Receive help with one or more ADL/Not	3.47	2.07–5.81
Dependent in Functional Health Scale/Not	3.02	1.37–6.65
Formal IADL help/No help or informal help*	1.34	0.78–2.29
Formal or informal IADL help/None*	1.51	0.87–2.65
Mental Status		
More mental status errors/Less	2.68	1.55–4.66
More depression/Less	1.26	0.78–2.06
Health Care Status		
Poor self-perceived health/Excellent, good, or fair	0.73	0.38–1.39

Proportion of Likelihood Explained—.098

*Each of the two characterizations of IADL were included in each of two separate Cox Proportional Hazard Models, not in the same model.

subsequent use of medical home care to any important extent.

These findings lend partial support to studies using criteria of need for assistance because of functional disability and limited informal support as evidenced by marital status to estimate the total size of the potential LTC population. For example, Weissert used the criteria of physical limitations (i.e., dependencies in personal care, mobility, household activities, or home delivered health care services) to estimate the size of the potential LTC population; he concluded that the total 1979 LTC population was 5.7 million, including 2.9 million people aged 65 or older (12.7 per cent of the noninstitutionalized aged).²³

In a different effort, a multivariate analysis of a prospective cohort in Massachusetts persons aged 65 or older identified predictors of nursing home placement, one subgroup of the LTC population.^{24,25} That study identified six non-medical characteristics associated with subsequent nursing home placement: two demographic characteristics (advancing age and living alone), three indicators of limitations in physical function (dependency in ADL; dependency in instrumental ADL such as shopping, food preparation,

housekeeping; and using ambulation aids), and an indicator of cognitive limitation (interviewer judgment of mental disorientation).

At an elementary level, the similarities are striking between the findings of the present study of predictors of medical home care and the criteria used in the earlier studies to estimate the size of an undifferentiated LTC population and the predictors of nursing home placement in other studies. Substantial physical and cognitive limitations are central in each study. Living alone or otherwise lacking an informal support network frequently has been a criterion for identifying the LTC population and usually has been a risk factor characterizing the important LTC subgroup who are in nursing homes. In the present study, however, rates of medical home care use were similar for those living alone and for those living with others.

Differences in this basic demographic characteristic between home care and institutional LTC or clients may have substantial implications. The assumption of substitutability of LTC services is a basic tenet of many current LTC policies. Medicaid administrators (as the primary government payors for institutional LTC) recently have tried to restrict Medicaid LTC expenditures for home-based as well as institutional services to their traditional clients: those who request institutional placement and who are both medically and economically eligible for institutional LTC. Based on the assumption of substitutability, their approach is to approve state requests for demonstration projects to use Medicaid funds for alternative (i.e., noninstitutional) services within an expanded continuum of care only for clients who would be medically eligible for institutional care. The Medicaid-waivered demonstration funds are for substituted or alternative services for traditional clients, not for new or additional services for a new group of clients.

The results of this study thus raise the possibility of a difference between the characteristics of home-care and institutional LTC clients. A more definitive test of this hypothesis can be pursued in the near future with additional data from East Boston. It will be possible to conduct an analysis in which the characteristics of three groups can be compared simultaneously: those who receive subsequent home care, those who receive subsequent institutional LTC, and those who subsequently receive neither. In that analysis, a direct comparison of characteristics which differentiate incident home care clients from incident nursing home patients from the same population will be tested.

ACKNOWLEDGMENTS

Presented in part at the 1985 annual meeting of the American Public Health Association and at the 1985 annual meeting of the Gerontological Society of America.

This work was supported in part by Contract NO1-AG-0-2107 with the National Institute on Aging.

REFERENCES

1. Koren M: Home cares? *N Engl J Med* 1986; 314:917-920.
2. Leutz W: Long-term care for the elderly: Public dreams and private realities. *Inquiry* 1986; 23:134-140.
3. Congressional Budget Office: Long-Term Care for the Elderly and Disabled. Washington, DC: Govt Printing Office, 1977.
4. Callahan JJ: How much, for what, and for whom? *Am J Public Health* 1981; 71:987-988.
5. Branch LG, Stuart NE: A five-year history of targeting home care services to prevent institutionalization. *Gerontologist* 1984; 24:387-391.
6. Branch LG: Home care is the answer: What is the question? *Home Health Care Serv Q* 1985; 6:3-11.
7. Baxter R, Applebaum R, Callahan J, *et al*: The Planning and Implementation of Channeling: Early Experiences of the National Long-Term Demonstration. Princeton, NJ: Mathematica Policy Research, 1983.
8. Greenberg J, Deutz W, Abrahams R: The national social health maintenance organization demonstration. *J Ambul Care Management* 1985; 8:32-61.
9. Capitman J, Haskins B, DeGraff B: Evaluation of Coordinated Community Based Long-Term Care Demonstrations: Final Report. (HCFA Pub. 500-90-0037) Berkeley, California: Berkeley Planning Associates, 1984.
10. Hughes SL, Manheim LM, Edelman PL, Conrad KJ: Impact of long-term home care on hospital and nursing home use and cost. *Health Serv Res* 1987; 22:19-48.
11. Weissert W: Toward a continuum of care for the aged: A note of caution. *Public Policy* 1981; 29:331-340.
12. Weissert W: The cost effectiveness trap. *Generation* 1985; 9:47-50.
13. Applebaum R, Baxter R, Callahan J, Day S: Targeting services to the chronically disabled elderly: The preliminary experiences of the national long term care channeling demonstration. *Home Health Serv Q* 1985; 6:57-79.
14. Cornoni-Huntley J, Brock DB, Ostfeld AM, Taylor JO, Wallace RB (eds): Established Populations for Epidemiologic Studies of the Elderly: Resource Data Book 1986. Washington, DC: Govt Printing Office, NIH Pub. No. 86-2443, 1986.
15. Katz S, Ford A, Moskowitz R, Jackson B, Jaffe M: Studies of Illness in the Aged. *JAMA* 1963; 185:914-919.
16. Branch LG, Katz S, Knipmunn K, Papsidero JA: A prospective study of functional status among community elders. *Am J Public Health* 1984; 74:266-268.
17. Rosow I, Breslau N: A Guttman scale for the aged. *J Gerontol* 1966; 21:556-559.
18. Pfeiffer E: A short portable mental status questionnaire for the assessment of organic brain deficit in elderly patients. *J Am Gerontol Soc* 1975; 23:433-441.
19. Radloff LS: The CES-D scale: A self-report depression scale for research in the general population. *Appl Psychol Meas* 1977; 1:385-401.
20. Kalbfleisch JD, Prentice RL: The Statistical Analysis of Failure Time Data. New York: John Wiley & Sons, 1980.
21. SAS Institute: SUGI Supplemental Library User's Guide, 1983 Ed. Cary, NC: SAS Institute, 1983.
22. Brody SJ, Poulshock SW, Masciocchi CF: The family caring unit: A major consideration in the long-term support system. *Gerontologist* 1978; 18:556-561.
23. Weissert WG: Estimating the long-term care population: prevalence rates and selected characteristics. *Health Care Financ Rev* 1985; 6:83-91.
24. Branch LG, Jette AM: A prospective study of long-term care institutionalization among the aged. *Am J Public Health* 1982; 72:1373-1379.
25. Branch LG: Relative risk rates of nonmedical predictors of institutional care among the elderly. *Comprehen Ther* 1984; 10:33-40.